



# Prescribing for Seniors

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# Goals of Prescribing

- lower pain/suffering/disability
- raise functional capacity
- promote quality of life
- prolong life



# *Therapeutic Planning*

- diagnosis
- non-drug treatment
- goals of treatment
- drug choice



# *Rx Principles for Seniors*

- know a few drugs well
- try for drug-free baseline
- *“start low-go slow”*
- 1/3 - 1/2 dose



# *Rx Principles for Seniors*

- Simple, written plan
- ask patient to repeat instructions
- involve family
- label Rx purpose (...*for leg swelling*)
- bring meds to each visit (*brown bag*)



# *Risk of Adverse Drug Effects*

- decreased organ function
- altered pharmacokinetics/dynamics
- drug-drug interactions
- drug-disease interactions
- drug prescribing “cascade”



# *Geriatric Prescribing*

- 12% of US population
- 33% of Rx drugs
- 44% of NSAID Rx's



# *Pharmacokinetics*

- absorption
- distribution
- metabolism
- **excretion** (most important)





# *Absorption*

- least affected by aging
- similar bioavailability
- rising gastric pH affects some drugs
- drug-drug interactions more important



# *Distribution*

- lower lean body mass (digoxin)
- lower ECF volume (aminoglycoside)
- higher adiposity (benzodiazepine)
- protein binding



# *Metabolism*

- lower hepatic blood flow (lidocaine)
- oxidation/reduction/hydrolysis (CYP450)
- conjugation



# *Excretion*

- ▶ Cockcroft-Gault formula for Renal function decline
- ▶  $\text{Cr clearance} = (140 - \text{age}) \times (\text{wgt Kg})$
- ▶  $\text{serum Cr} \times 72 (\times 0.85 \text{ women})$



# *Pharmacodynamics*

- Receptor sensitivity (beta blockers)
- drug-disease interactions



# *Polypharmacy*

- Risk of drug interactions
  - 2 drugs = ~6%
  - 5 drugs = ~50%
  - 8 drugs = ~100%



# *Cost Estimate Nursing Homes*

For each \$ spent on  
Rx...

\$ spent on  
complications of Rx



# *Polypharmacy*

- Study of 272 patients
  - 33% had 5+ meds
  - reductions advised 2/3
  - lower: costs, doses, Rx's





# *Polypharmacy*

- Study conclusions
  - prescriber education
  - simplify easier than D/C
  - patient education
  - provider communication



# *Brown Bag Check*

- OTC drugs
- vitamins
- minerals
- supplements
- Herbs



# *Over-the-Counter Drugs*

- 70 % of patients use
- 30,000 available, 700+ ingredients
- women use = 2X men
- analgesics, nutritionals most used



# *Over the Counter Drugs*

## *• “Nutritional Supplements”*

- no testing*
- no identity standards*
- no health claims...**technically***
- **>\$10 billion** annual market*
- mythology: “not drugs” “safe”*



# *Therapeutic Planning*

- Diagnosis
- treatment goal
- non-drug treatment
- drug Rx



# *Therapeutic Planning*

- Drug choice
  - efficacy
  - cost
  - ease of use
  - at-risk patient/safety



# *Therapeutic Planning*

- Single drug for multiple problems
  - alpha blocker for HTN & BPH
  - beta blocker for HTN & migraine
  - ACE inhibitor for HTN & CHF



# *Compliance*

- 40% inadequate
  - poor communication
  - low memory, vision, cognition
  - side effects
  - complex schedules
  - confusion as to purpose





# *Compliance*

- Written instructions = + ~**30%**
- easily understood, 4th Grade level
- use lay terms
- concise and specific
- label Rx purpose: “*for ankle swelling*”



# *Drug Interactions*

- Most important drugs:
  - warfarin
  - fluoroquinolones
  - anticonvulsants
  - HMG CoA's (statins)



# *Sildenafil (Viagra)*

- **Absolutely** contraindicated w/nitrates
- CYP4503A metabolized
- Caution: erythromycin, cimetidine, 'conazoles, alpha blockers (4 hrs)
- start @ 25 mgm with above, or >65
- grapefruit juice inhibits P4503A4



# *Tadalafil (Cialis)*

- ▶ Phosphodiesterase 5 inhibitor
- ▶ low renal/hepatic fx = lo dose
- ▶ CYP3A4 ('conazoles, ritonavir)
- ▶ Contra: alpha-blockers, nitrates
- ▶ Tamsulosin (Flomax) OK



# Vardenafil

*(Levitra)*

- PD 5 inhibitor
- Lo dose in hepatic impairment
- Lo dose w/'conazoles, ritonavir, Indinavir, erythromycin
- Contra: nitrates, alpha blockers



# *NSAIDs - over 65*

- ~80% have osteoarthritis, ~1/2 severe
- Rx goals
  - improve function
  - reduce pain
  - ? Preserve joint



# *NSAIDs - over 65*

- ~40% of NSAID Rx's
- protein bound
  - levels rise w/low albumen
- primary hepatic metabolism
  - levels rise w/low hepatic blood flow
- NSAIDs = 1/4 of adverse drug events



# *NSAIDs - over 65*

- 1-4% have serious GI problem
- ~16,500 deaths/yr in osteo & rheumatoid arthritis patients
- most GI problems w/o warning
  - painless bleed





# *NSAID Risk Factors*

- Established:
  - advanced age ( $>75$ )
  - h/o ulcers
  - corticosteroid use
  - Hi-dose/multiple NSAIDs
  - serious systemic disease



# *NSAID Risk Factors*

• Possible:

- cigarette smoking
- alcohol use
- *H. pylori* infection



# *Safe Rx for Elderly Arthritics*

- Analgesic choice:
  - pure analgesic (acetaminophen)
  - nonacetylated salicylate (salsalate)
  - safer NSAIDs (Cox 2)
  - NSAID + mifepristone
  - NSAID + proton pump inhibitor



# *Safe Rx for Elderly Arthritics*

## • Renal risks:

- age
- diuretics
- renal disease (diabetes, HTN)



# *Safe Rx for Elderly Arthritics*

- Highest risk NSAIDs
  - flurbiprofen (Ansaid)
  - piroxicam (Fledene)
  - indomethacin (Indocin)
  - meclofenamate (Meclomen)
  - oxaprozin (Daypro)



# *Safe Rx for Elderly Arthritics*

- Safer:
  - etodolac (*Lodine*)
  - nabumetone (*Relafen*)
  - salsalate (*Dilalsid*)
  - sulindac (*Clinoril*)
- All 4 OTC NSAIDs are medium-risk
  - ibuprofen, ketoprofen, ASA, and naproxen



# *Safe Rx for Elderly Arthritics*

- ▶ MAX local/non-medicinal Rx
- ▶ ID Hi-risk patients
- ▶ monitor carefully



# *Cox-2 Inhibitors*

- Relatively selective
  - etodolac (*Lodine*)
  - meloxicam (*Mobic*)
- Highly selective
  - celecoxib (*Celebrex*)
  - rofecoxib (*Vioxx*)





# *Cox-2 Inhibitors*

- Drug Interactions
  - **celecoxib** is CYP450-2C9 metabolized
  - may increase amiodarone, cimetidine, fluvastatin, omeprazole, zafirlukast
- Documented Interactions
  - **rofecoxib** with methotrexate, warfarin, rifampin
  - **celecoxib** with lithium, fluconazole



# *Cox-2 Inhibitors - Safety*

- No dose adjustment in elderly - use lowest
- contraindicated in ASA sensitivity
- **celecoxib** contraindicated in sulfa allergy
- Cox-2's may worsen HTN, edema (CHF)
- little antiplatelet effect - not protective
- but...with ETOH or anticoagulant, may increase bleeding



# *Cox-2 Inhibitors-----*

## *True or False?*

- Arthritis patients on COX-2's can still get ulcers
- Peptic ulceration and bleeding doubles when ASA combined with COX-2's
- Patients on COX-2's may have more heart attacks than with older NSAID's



# *Cox-2's - Bottom Line*

- Cox-2's effect = older NSAIDs
- \$400,000 per 500 lo-risk patients to prevent *one* ulcer related complication
- 40 hi-risk patients to prevent one ulcer related complication (>75 yo, h/o ulcer)
- Cox-2 more cost effective in hi-risk than NSAID + misoprostol or PPI



# *DM Treatment Questions*

- Glitazones (*Actos*, etc) may precipitate heart failure due to plasma volume expansion
- metformin is not safe in renal failure
- Insulin & sulfonylureas reduce microvascular events
- metformin reduces macrovascular/CV events in obese diabetics (UKPDS)



***The Good,***

***The Bad,***

***and***

***The UGLY!***



# *The Good...*

- Beta blockers post MI
- ASA in seniors w/ MI & stroke risk
- ACE's in CHF (& spironolactone)
- warfarin in atrial fibrillation
- diuretic/ACE/betablockers - HTN



# *The Bad...*

- Propoxyphine (Darvon)
- meperidine (Demerol)
- long 1/2 life benzo's (diazepam)
- amitriptyline (Elavil)





# *The UGLY!*

- supplement w/side effects, no benefit
- Vitamin E for heart disease
- *Ginko biloba* for memory improvement
- multivits w/IRON
- ZINC in Hi doses (>15 mgm RDA)



# *10 Steps to reduce Polypharmacy*

- 1 Brown bag checks
- 2 generic names, learn class
- 3 know side effects
- 4 age changes pharmacodynamics/kinetics
- 5 ? Indications for drug Rx



# *10 Steps to reduce Polypharmacy*

- 6 stop drugs not helping
- 7 stop drugs w/o clear indication
- 8 switch to less toxic Rx
- 9 avoid prescribing “cascade”
- 10 “one disease, one drug, once a day”
- (Carlson, Perils of Polypharmacy, Geriatrics 1996)



# *Excellent Reference*

- Using Medications Appropriately in Older Adults
- Cynthia M Williams, CAPT, MC, USN
- American Family Physician, Vol 66, #10, 15 November 2002, p 1917

